REMARKS

Claims 1 – 14 are pending in the above-identified application.

In the Office Action, Claims 1 – 14 were rejected.

In this Amendment, Claims 1, 2, 3, 8, 9 and 10 are amended, and Claims 4 and 11 are cancelled. No new matter has been introduced as a result of this Amendment.

Accordingly, Claims 1 – 3, 5 – 10 and 12 – 14 are at issue.

I. 35 U.S.C. § 112 Indefiniteness Rejection of Claims

Claims 1 – 14 were rejected under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for ethylene carbonate and/or propylene carbonate as high dielectric constant solvents, does not reasonably provide enablement for the entire group of high dielectric constant solvents as recited in Claims 1 and 8.

While Applicants do not agree and reserve the right to show otherwise, for the present purpose Applicants have amended Claims 1 and 8 at issue, and respectfully request that this claim rejection be withdrawn.

II. 35 U.S.C. § 112 Indefiniteness Rejection of Claims

Claims 1 – 14 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the remarks made by Applicants in the response filed on August 10, 2007, Applicants intended to discuss the limitations "a polymer" and "a compound" as elements of the electrolyte rather than as elements of the electrolyte solution.

Applicants have amended Claim 8 by replacing the "a compound" limitation with the "a polymer" limitation, which remain distinct from the elements of the Markush group of the electrolyte solution.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

III. 35 U.S.C. § 103 Obviousness Rejection of Claims 1 - 14

Claims 1-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Publication No. 2002-15771, hereafter referred to as *JP'771*.

Claim 1 is directed to an electrolyte. Claim 1 has been amended by incorporating the substantive limitations of Claim 4. The claimed electrolyte comprises an electrolytic solution containing at least one selected from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total, and a polymer. The polymer is gelatinized with the electrolytic solution, and the electrolytic solution is diffused or held within the polymer. The electrolytic solution contains 95 wt % or more of a *combination of ethylene carbonate and propylene carbonate. The electrolytic solution contains a lithium salt that contains at least one selected from the group consisting of* $LiClO_4$, *LiN* $(C_2F_5SO_2)_2$, *LiC* $(CF_3SO_2)_3$, $LiAlCl_4$ *and* $LiSiF_6$.

That is, in the relevant part of Claim 1, the electrolyte solution contains at least one element selected from the group consisting of vinylethylene carbonate and its derivatives in the range of 0.05 wt % to 5 wt % in total and a polymer, and contains 95 wt % or more of a combination of ethylene carbonate and propylene carbonate. The electrolytic solution further contains a lithium salt that contains at least one selected from the group consisting of $LiClO_4$, LiN $(C_2F_5SO_2)_2$, LiC $(CF_3SO_2)_3$, $LiAlCl_4$ and $LiSiF_6$.

By controlling the claimed weight ratio of the ethylene carbonate and propylene carbonate and by adding vinylethylene carbonate and/or its derivatives, the electrolyte attains a substantially high chemical stability and a substantially high capacity which leads to less swelling of the container of the battery. As such, the battery containing this claimed electrolyte performs with desirable low temperature characteristics and load characteristics.

In contrast, *JP'771* discloses in Paragraphs [0099] – [0101] that (emphasis added):

"[0098] The reason for specifying the rate to the whole non-aqueous solvent of each solvent in said range is explained.
[0099] a. Gamma-butyrolactone (BL)
It is become easy to generate gas at the time of an elevated temperature that the ratio (z) to the whole non-aqueous solvent of BL is under 30 volume %. Moreover, since each of other solvents is annular carbonate, if the ratio of BL is made under into 30 volume %, the ratio of annular carbonate will become high relatively and solvent viscosity will become remarkably high. Consequently, since the conductivity and permeability of nonaqueous electrolyte fall sharply, a charge-and-discharge cycle property and the discharge property under the low-temperature environment near -20 degree C fall. On the other hand, if a ratio exceeds 85 volume %, since the reaction of a negative electrode and BL will arise, a charge-and-discharge cycle property falls. That is, if a negative

electrode (for example, thing containing the carbonaceous object which carries out occlusion emission of the lithium ion), and BL react and reduction decomposition of nonaqueous electrolyte arises, the coat which checks a charge-and-discharge reaction on the surface of a negative electrode will be formed. Consequently, since it becomes easy to produce current concentration in a negative electrode, a lithium metal deposits, or the impedance of a negative-electrode interface becomes high, the charge-and-discharge effectiveness of a negative electrode falls to a negative-electrode front face, and the fall of a charge-and-discharge cycle property is caused. *A more desirable ratio is 35 volume % - 85 volume %, a still more desirable ratio is below 75 volume % more than 35 volume %, and the most desirable ratio is below 75 volume % more than 55 volume %.*

"[0100] b. Ethylene carbonate (EC)

Since there is a possibility that it may become difficult to cover a negative-electrode front face by the protective coat when the ratio (x) to the whole non-aqueous solvent of EC is made under into 15 volume %, the reaction of a negative electrode and BL progresses and it becomes difficult to fully improve a charge-and-discharge cycle property. *On the other hand, since there is a possibility that the viscosity of nonaqueous electrolyte may become high and ionic conductivity may fall when the ratio of EC exceeds 50 volume %, it becomes difficult to fully improve a charge-and-discharge cycle property and a low-temperature discharge property. The more desirable range of the ratio of EC is below 50 volume % more than 20 volume %, and the still more desirable range is below 40 volume % more than 20 volume %.*

[0101] c. Propylene carbonate (PC)

If the ratio (y) to the whole non-aqueous solvent of PC is made under into 2 volume %, it becomes difficult to carry out eburnation of the protective coat on the front face of a negative electrode, the reaction of a negative electrode and BL will progress and it will become difficult to fully improve a charge-and-discharge cycle property and a low-temperature discharge property. *On the other hand, if the ratio of PC exceeds 35 volume %, the viscosity of nonaqueous electrolyte will become high and ionic conductivity will fall. Moreover, the generation of gas at the time of elevated-temperature storage and an initial charge becomes remarkable, and it becomes difficult to fully improve a charge-and-discharge cycle property. The more desirable range of the ratio of PC is below 30 volume % more than 2 volume %, the still more desirable range is below 25 volume % more than 2 volume %, and the still more desirable range is below 20 volume % more than 2 volume %. The most desirable range is below 20 volume % more than 3 volume %.*"

Thus, the contents of both ethylene carbonate (EC) and propylene carbonate (PC) in the electrolyte taught by *JP'771* are in the range of 70 wt % or less based on the fact that the content z of gamma-butyrolactone (BL), given in wt% or volume, is characterized by 30 <=z <=85, which is outside the "95 wt % or more" range of the combination of EC and PC claimed in the present invention. Moreover, as stated since each of other solvents is annular carbonate, if the ratio of BL is made under into 30 volume %, the ratio of annular carbonate will become high

relatively and solvent viscosity will become remarkably high. Consequently, the conductivity and permeability of nonaqueous electrolyte fall sharply, a charge-and-discharge cycle property and the discharge property under the low-temperature environment near -20 degree C fall. Thus, *JP'771* teaches that BL, participating with a desirable ratio is 30 volume % - 85 volume %, is an essential element of the electrolyte to improve low-temperature characteristics. Further, *JP'771* teaches that the viscosity of nonaqueous electrolyte becomes high and ionic conductivity falls when the ratio of EC exceeds 50 volume %, and when the ratio of PC exceeds 35 volume %. Therefore, contrary to the Examiner's assertion *JP'771* teaches away from the claimed ranges of the combination of EC and PC, which is required to be 95 wt % or more. Thus, *JP'771*does not support a prima-facie obviousness to select the claimed weight of the EC and PC by any process, including an optimization process.

Moreover, the claimed electrolytic solution contains a lithium salt that contains at least one selected from the group consisting of $LiClO_4$, LiN $(C_2F_5SO_2)_2$, LiC $(CF_3SO_2)_3$, $LiAlCl_4$ and $LiSiF_6$. In contrast, as stated by the Examiner in regard to cancelled Claim 4, *JP'771* discloses an electrolyte solution that contains a lithium salt such as $LiBF_4$, $LiPF_6$, $LiAsF_6$, $LiCF_3SO_3$, and LiN $(CF_3SO_2)_2$, which are different from the

Thus, for at least the above cited differences, Claim 1 is patentable over *JP'771*, as are dependent Claims 2 – 7, for at least the same reasons.

Independent Claim 8 recites the same distinguishable limitation as that of Claim 1. Thus, Claim 8 is patentable over *JP'771*, as are dependent claims 9 – 14, for at least the same reasons.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

IV. 35 U.S.C. § 103 Obviousness Rejection of Claims 1 - 14

Claims 1-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *JP'771* in view of Japanese Publication No. 2001-057234 (hereafter referred to as *JP'234*).

The Examiner acknowledges that *JP'771* does not expressly disclose the specific weight percentage of the high dielectric constant solvent, i.e. ethylene carbonate and propylene

carbonate, but asserts that *JP'234* allegedly does by pointing to the Abstract and Paragraphs [0003] and [0025] – [0026] for support.

However, as stated above because in *JP'771* the essential element gamma-butyrolactone (BL) is required to participate with a ratio of 30 volume % - 85 volume % in the electrolyte, then a combination of *JP'771* and *JP'234* also requires the same volume or weight ratio for BL.

Moreover, *JP'234* also fails to teach or suggest that the electrolytic solution contains a lithium salt that contains at least one selected from the group consisting of $LiClO_4$, LiN $(C_2F_5SO_2)_2$, LiC $(CF_3SO_2)_3$, $LiAlCl_4$ and $LiSiF_6$.

Therefore, Claims 1 and 8 are patentable over *JP'771* and *JP'234*, taken singly or in combination with each other, as are their corresponding dependent claims, for at least the same reasons.

Accordingly, Applicants respectfully request that these claim rejections be withdrawn.

V. Conclusion

In view of the above amendments and remarks, Applicant submits that Claims 1 – 3, 5 – 10 and 12 – 14 are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

Dated: Nov. 29, 2007 By: _____

David R. Metzger
Registration No. 32,919
SONNENSCHEIN NATH & ROSENTHAL LLP
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, Illinois 60606-1080
(312) 876-8000